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USSR Report

ENERGY

No. 25



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FUELS

FUEL-ENERGY BALANCE FOR 1980 DISCUSSED

Moscow VESTNIK STATISTIKI in Russian No 6, Jun 80 pp 16-29

[Questions and answers recorded in a consultation participated in by Ivan Ivanovich Yevdokimenko, chief of the Material and Technical Supply and Censuses Administration, Valentina Alekseyevna Voropayeva, senior economist, Central Computer Center, and Aleksandr Petrovich Kolesnikov, candidate of economic sciences, section chief, Material and Technical Supply and Censuses Administration, all of the USSR Central Statistical Administration]

[Text] In 1981 the statistical administrations of oblasts, krays and ASSR's and the central statistical administrations of union republics must prepare a summary fuel-energy balance report for 1980.

In the fourth quarter of the current year the central statistical administrations of the union republics must conduct instructional conferences with representatives of ministries and departments on the question of the procedure in the compilation of fuel-energy balance reports by enterprises and also the statistical administrations of ASSR's, krays and oblasts. The present consultation session has the purpose (in addition to the instructions approved by the USSR Central Statistical Administration) of answering a number of questions connected with the procedure in the compilation, verification and analysis of those balances.

[Question] Which enterprises and organizations must report on fuel-energy balance forms and what preparations must be made by the central statistical administrations of the union republics and the statistical administrations of the ASSR's, krays and oblasts in connection with the preparation of the fuel-energy balance for 1980?

[Answer] The fuel-energy balance is compiled on form No 1-TEB by the following enterprises, organizations and other economic units on an independent balance:

1) all state enterprises (except sovkhoses), organizations and other economic units that are fuel and energy consumers with a maximum daily

expenditure of 2 tons or more of standard fuel or of 15 Gcalories or more of thermal energy, or with a connected (installed or permitted for use) electric capacity of 100 kV-A (kW) or more (regardless of the energy source). In that case the enterprise (organization) corresponding to one of the indicated signs (qualifications) must report on form No 1-TEB, even if in the report year some of the given indicators will be below the set qualification;

2) all enterprises that produce fuels or energy (coal and shale mines, oil and gas extracting enterprises, peat enterprises, oil refineries, gas refineries and shale-processing plants, briquet plants, coke chemical and gas plants, timber procurement establishments, forestry stations, energy administrations, industrial-production boiler rooms, regional boiler rooms, heating boiler rooms with a capacity of 20 Gcal/hr or more, the management of combined boiler and heating networks, enterprises for the production of semicoke, liquid and gaseous fuels from coal, etc);

3) all enterprises and organizations of railroad transport, all sales organizations supplying fuels and energy (administrations for supply and sales of coal or petroleum products, administrations or offices for supply and sales of forest products, administrations for supply and sales of coke chemicals, administrations of main oil-products and product pipelines, gas-pipeline administrations, municipal organizations for the supply of gas (gorgazy) and fuels (gortopy), etc), regardless of their daily fuel or energy consumption.

State enterprises and organizations which are consumers of fuel and energy resources with a daily expenditure of less than 2 tons of standard fuel, of less than 15 Gcal of thermal energy and with a connected (installed or permitted for use) electric capacity of less than 100 kV-A (kW), sovkhoses, kolkhozes (including fishing kolkhozes) and inter-farm enterprises and associations, and also enterprises and organizations subordinate to the USSR Central Union of Consumer Societies, do not compile a "Report Fuel-Energy Balance of an Enterprise (Organization)" on form No 1-TEB, but submit in its place a "Report on Residues, Receipts, Expenditures and Releases of Fuel and Energy" on form No 1-RTE.

In connection with the preparation of the report fuel-energy balance for 1980 the USSR Central Statistical Administration has sent letters to the councils of ministers of the union republics requesting that they issue appropriate instructions to subordinate enterprises and organizations of ministries and departments of the republics on work to be done on the compilation of that balance.

Similar letters have been sent to all union and union-republic ministries and departments.

The central statistical administrations of the union republics and the statistical administrations of the ASSR's, krays and oblasts must in the second half of 1980:

- a) adopt measures to have the republic ministries, departments and ispolkoms of the Councils of People's Deputies issue in time orders or rulings on the compilation by enterprises or organizations subordinate to them of report fuel-energy balances on form No 1-TEB or reports on residues, receipts, expenditures and releases of fuel and energy on form No 1-RTE;
- b) compile a list of all the enterprises and organizations present on the area of an oblast (kray or republic) and obligated to submit a report fuel-energy balance on form No 1-TEB or a report on residues, receipts, expenditures and releases of fuel and energy on form No 1-RTE. Those lists will be necessary in the distribution of balance blank forms, and also for the registration of the receipt of balances and records in statistical administrations;
- c) assure the timely obtaining of blank forms and instructions by all enterprises and organizations. When there are not enough blank forms the statistical administrations must request them from the central statistical administrations of the union republics;
- d) train workers of the material and technical supply statistical sections to conduct in December 1980 instructional conferences on the compilation of fuel-energy balance reports with workers of ministries, departments, enterprises and organizations;
- e) compile an organizational plan of work connected with the preparation of a summary fuel-energy balance report for 1980.

[Question] In which areas is the summary fuel-energy balance being prepared by the central statistical administrations of the union republics and the statistical administrations of the ASSR's, krays and oblasts?

[Answer] The summary fuel-energy balance is being prepared:

a) by territory--on the whole for all enterprises, organizations, sovkhoses, kolkhozes (including fishing kolkhozes), inter-farm enterprises and associations situated on the territory of an oblast, kray or republic, on form No 1-TEB (summary) and appendices to the balance:

No 1 (section A) "Receipt of fuel and energy from outside" (decipherment of column 3, form No 1-TEB (summary) "Deliveries from outside");

No 1 (section B) "Releases of fuel and energy to outside" (decipherment of column 24, form No 1-TEB (summary) "Export beyond the borders of the oblast, kray, or republic");

No 2 "Direct consumption as fuel or energy" (decipherment of column 20, form No 1-TEB) (summary);

No 2a "Direct expenditure of fuel and energy on the productive needs of the enterprises themselves, connected with the production of electric power, thermal energy and compressed air, and also the extraction (production) of fuel and other production of the fuel industry (decipherment of column 20-1, appendix No 2, form No 1-TEB) (summary) "Expenditure of fuel

and energy on the output of production of electric power engineering and the fuel industry");

b) by sectors of the national economy and sectors of industry--for enterprises and organizations situated on the territory of an oblast, kray or republic and belonging to separate sectors of the national economy (and by transport as well as types of transport) and sectors of industry, data are developed on fuel and energy consumption according to appendix No 3 to the balance on form No 1-TEB (summary)*,

c) by jurisdiction--for enterprises and organizations situated on the territory of an oblast, kray or republic and subordinate to each union and union-republic ministry (department) (including dual-purpose enterprises and organizations), and also to the Council of Ministers of a union republic (by republic ministries and departments on the whole), data are being prepared on the consumption of fuel-energy resources by purposes of expenditure according to appendix No 4 to the balance on form No 1-TEB (summary), with the interpretation of "Direct Consumption of Fuel and Energy" (group 20 of appendix No 4) according to indicators presented in appendix No 2 to the balance on form No 1-TEB (summary), and also "Expenditures of Fuel and Energy on the Output of Production of Electric Power Engineering and the Fuel Industry" (group 20-1 of appendix No 2 by ministry (department) according to the indicators presented in appendix No 2a to the balance on form No 1-TEB (summary).

In addition, the following are being prepared:

a) a grouping of industrial enterprises on independent balance and situated on the territory of the oblast, kray or republic, in accordance with the rate of their fuel and electric power consumption in 1980 (in accordance with the scheme presented in the Instruction on the Procedure for Preparation of the Summary Fuel-Energy Balance);

b) a summary "Report on Residues, Receipts, Expenditures and Releases of Fuel and Energy" on form No 1-RTE (summary):

--by sovkhozes (subordinate to the USSR Ministry of Agriculture and the Ministry of State Farms, including sovkhozes of Skotoprom [not further identified] in the system of those ministries) situated on the territory of an oblast, kray or republic;

--by kolkhozes situated on the territory of an oblast, kray or republic;

*In accordance with the list of sectors of the national economy and sectors of industry presented in appendix No 1 to Instructions on the Procedure in Compiling "Report fuel-energy balance of an enterprise (organization)" on form No 1-TEB for 1980.

--by inter-farm enterprises and associations in agriculture located on the territory of an oblast, kray or republic.

[Question] For which unionwide and union-republic ministries and departments are data being prepared on fuel and energy consumption in accordance with appendix No 4 to the balance on form No 1-TEB (summary)?

[Answer] Those data, with the interpretation of the "Direct Consumption of Fuel and Energy" in accordance with the indicators of appendix No 2 to the balance on form No 1-TEB (summary), and also "Expenditure of Fuel and Energy on the Output of Production of Electric Power Engineering and the Fuel Industry" in accordance with the indicators of appendix No 2a to form No 1-TEB (summary) are prepared by enterprises and organizations of the following union and union-republic ministries: of Power and Electrification USSR; of the Petroleum Industry; of the Petroleum Refining and Petrochemical Industry USSR; of the Gas Industry; of the Coal Industry USSR; of Ferrous Metallurgy USSR; of Nonferrous Metallurgy USSR; of the Chemical Industry; of Heavy and Transport Machine Building; of Power Machine Building; of the Electrical Equipment Industry; of Chemical and Petroleum Machine Building; of Machine Building; of the Machine Tool and Tool Building Industry; of Instrument Making, Automation Equipment, and Control Systems; of Machine Building for Animal Husbandry and F-ider Production; of the Automotive Industry; of Tractor and Agricultural Machine Building; of Construction, Road and Municipal Machine Building; of Machine Building for Light and Food Industry and Household Appliances; of the Aviation Industry; of Defense; of the Shipbuilding Industry; of the Radio Industry; of the Electronics Industry; of the Communication Equipment Industry; of the Timber and Wood Processing Industry USSR; of the Pulp and Paper Industry; of the Construction Materials Industry USSR; of Light Industry USSR, of the Food Industry USSR; of the Meat and Dairy Industry USSR; of the Fish Industry USSR, of the Medical Industry; of Geology USSR; of Agriculture USSR; of Land Reclamation and Water Resources USSR; of Procurement USSR; of Railways; of the Maritime Fleet; of Civil Aviation; of Communications USSR; of Construction of Heavy Industry Enterprises USSR; of Industrial Construction USSR; of Construction USSR; of Construction of Petroleum and Gas Industry Enterprises; of Construction in Regions of the Far East and Zabaykal'ye (Minvostokstroy); of Rural Construction USSR; of Transport Construction; of Installation and Special Construction Work USSR; of Higher and Secondary Specialized Education USSR; of Education USSR; of Culture USSR; of Health USSR; of Internal Affairs USSR; the Main Administration of the Microbiological Industry under the USSR Council of Ministers; the USSR State Committee for Supply of Production Equipment for Agriculture (Goskomsel'khoztekhnika); the Central Union of Consumers' Cooperatives (Tsentsosyuz); the All-Union Central Council of Trade Unions (VTsSPS).

The list of republic ministries and departments for which data are being prepared on fuel and energy consumption in accordance with appendices No 4, 2 and 2a to the balance on form No 1-TEB (summary) will be reported to the statistical administrations of ASSR's, krays and oblasts by the central statistical administrations of the union republics.

[Question] The reports of which organizations of the USSR Ministry of Agriculture and the ministries of state farms of union republics must be included in the summary report on form No 1-RTE (summary) on state farms, and also the reports of which kolkhozes must be included in the summary on kolkhozes?

[Answer] The data of reports of all kolkhozes (except fishing kolkhozes subordinate the USSR Ministry of the Fish Industry) must be included in the summary report on form No 1-RTE (summary) on kolkhozes.

The summary report on form No 1-RTE (summary) on sovkhoses must include the reports of the following units subordinate to the USSR Ministry of Agriculture and the ministries of state farms of union republics:

a) sovkhoses (grain, cotton, sugar beet, vegetable, vegetable and dairy, orchard and vineyard, vineyard, pig farming, sheep raising (including Karakul), poultry, essential oil, tobacco and rustic tobacco, tea, fruit and berry, fruit and vegetable, fruit-crop nursery, soya, flax, melon, horse raising, fur farming, deer breeding and beekeeping), and also cattle fattening farms of Skotoprom;

b) poultry farms;

c) pedigreed stock farms;

d) horse-breeding farms;

e) sovkhos technical schools under the jurisdiction of production administrations of the USSR Ministry of Agriculture;

f) sovkhoses on the balance of production associations in agriculture of the system of the USSR Ministry of Agriculture.

The summary report on form No 1-RTE (summary) on sovkhoses does not include report data of enterprises and organizations of agriculture: bee-keeping farms, plant breeding stations, poultry incubation stations, artificial animal insemination stations, and also agricultural enterprises of scientific research and educational institutions (for example, sovkhos technical schools under the jurisdiction of the Administration of Cadre Training of the USSR Ministry of Agriculture, etc) and cattle fattening farms under the USSR Ministry of the Meat and Dairy Industry.

[Question] On which form does a production association (combine or trust) compile the summary report if one part of the enterprises subordinate to it has submitted a balance on form No 1-TEB, and the other part has presented reports on form No 1-RTE?

[Answer] In that case the production association (combine or trust) prepares two summary reports: for the enterprises which have submitted a balance on form No 1-TEB, and separately for enterprises which have submitted a report on form No 1-RTE (on forms appropriate for each report).

[Question] The data of which enterprises and associations must be included in the summary report on form No 1-RTE (summary) for inter-farm enterprises and associations in agriculture?

[Answer] The summary report on form No 1-RTE (summary) for inter-farm enterprises and associations in agriculture must include the data of reports:

- a) of inter-farm enterprises for the production of agricultural products:
 - of plant-growing (for the growing of fodders, fruit-growing, gardening, vegetable-growing, seed-growing, etc);
 - animal husbandry (the raising and fattening of cattle, the purposeful raising of heifers, milk production, pig-raising, sheep-raising, the raising and fattening of cattle and pigs, the raising and fattening of several species of animals, poultry-raising and other products of animal husbandry);
- b) of inter-farm enterprises for servicing agricultural production (the mechanization of work, land reclamation, chemicalization and increase of soil fertility, electrification, laboratories, stations and posts for the artificial insemination of agricultural animals, automotive transport, maintenance, etc).

[Question] How will one keep track of fuel and energy expenditures in schools, hospitals and clubs that are included in the budgets of rural councils of people's deputies--in the total expenditure of the rural council or according to the department to which they belong (ministries of education, health or culture)?

[Answer] The balance on form No 1-TEB and the report on form No 1-RTE are submitted by enterprises and organizations that are on independent balance and they must contain data on fuel and energy expenditures on all facilities on the balance of those enterprises and organizations. Thus, if the schools, hospitals and clubs are on the balance of settlement or rural councils of people's deputies, the latter must submit separate reports on the departmental affiliation of the organizations on their balance. Similarly, if the schools, hospitals and clubs are on the balance of corresponding rayon or municipal organizations, etc, then the reports must be submitted by the organization on the balance of which it is.

In certain cases sections of the ispolkoms of the councils of people's deputies, by agreement with the statistical administration of the oblast (kray or ASSR) can submit a summary report on all the enterprises subordinate to them, without including data on enterprises and organizations with a dual purpose; if enterprises and organizations subordinate to the ispolkom of the Council of People's Deputies belong to different sectors of the national economy and industry, then separate summary reports must be submitted for each sector. Enterprises and organizations with a dual purpose, on an independent balance and not a part of any sort of production association, must submit a balance on form No 1-TEB or a report on

Form No 1-RTE to the statistical administration for the place of its location and of its superior organization. Data of those enterprises and organizations are not included in the summary report for the ispolkom of the Council of Worker's Deputies, because in accordance with the program for the preparation of the report summary fuel-energy balance for 1980 approved by the USSR Central Statistical Administration, they must be included in the summary for the corresponding ministry (department) to which they are subordinate.

[Question] Which were the principal errors discovered in the summary fuel-energy balances for 1975 submitted by the central statistical administrations of the union republics?

[Answer] The most frequent error committed in the preparation of the summary fuel-energy balances of the union republics (ASSR's, krais and oblasts) in past years was correlation of the balance indicators with the corresponding indicators of the annual statistical reporting by industry (indicators for the extraction and production of separate types of fuel and energy, on the expenditure of fuel on the production of electric power, thermal energy and industrial production, etc). That error was encountered in a number of fuel-energy balances of ASSR's, krais and oblasts.

In connection with inadequate arithmetic monitoring of the fuel-energy balances and their appendices, the separate indicators obtained as a result of summation of data from appendices No 4 to the balance "On the consumption of fuel and energy resources by purposes of expenditure" for ministries distinguished in the balance proved to be higher than the corresponding balance indicators for the republic as a whole.

For some republics the summary report balance included insufficiently verified balances and reports of enterprises and organizations in which the data on gasoline and diesel fuel were shown in liters or kilograms, and not in tons. This caused the summary data on their expenditures at enterprises and in organizations to be much larger than the data on total expenditures for the republic.

As a result of the repetitious counting of gas and oil expenditures in the balances of the union republics in the summary of data on those indicators it turned out that the quantity of expended oil and gas exceeded the available resources in the republic. In the study of that situation it became clear that in the column "Expenditure as raw material for processing into other types of fuel and non-fuel products corresponding to them" the gas-processing enterprises of the Ministry of the Gas Industry showed the entire volume of gas received at plants. In fact, in that column it was necessary to show only the rates of sedimentation in production and losses during processing, and to record expenditures on their own needs in the corresponding graphs of the distribution part of the balance, depending on the direction of its use, the transfer of dry gas to the gas pipeline network shown as releases to the outside, in column 24 of the balance. In the

preparation of the fuel-energy balance for 1980 one must bear in mind that the total volume of gas expenditures for the gas-processing plant must be equal to the difference between the volume of gas received and the volume of dry gas transferred to the gas pipeline network.

Similar errors occurred in determining the expenditure of oil as a raw material for oil stabilization installations. In the report balances for those installations the expenditure as raw material included all oil received for stabilization, and not that part of it which remained at the enterprises in the form of a broad fraction, unstable benzine or other intermediate fractions. In that case the oil-processing enterprises which obtain stabilized oil showed it a second time (correctly!) in their balance as used as raw material for processing into other types of fuel.

In the summary fuel-energy balances for 1975 received from some central statistical administrations of the union republics the calorie equivalents of not all types of fuel (especially of oil products) were verified, and this made it necessary to calculate a second time the balance indicators in standard fuel.

In separate balances the names of coals were incorrectly written by basins and deposits, and the indicators of the form of the balance and its appendices also were not correlated.

The correction of all the above-indicated errors in the summary fuel-energy balances for 1975 submitted by the central statistical administrations of the union republics considerably increased the volume of work at the Central Computer Center of the USSR Central Statistical Administration and had the result that the materials of the summary balance were produced in later periods.

[Question] On which form must a heating boiler room with a capacity of less than 20 Gcal/hr be reported?

[Answer] In accordance with the instructions on procedure in the compilation of the fuel-energy balance of an enterprise (organization) on form No 1-TEB for 1980 a heating boiler room with a capacity of less than 20 Gcal/hr, not a part of combined boiler and thermal networks but on independent balance, is not classed as an enterprises but is considered an enterprise-consumer of fuel and energy, since the fuel used by that boiler room for the production of fuel and energy is considered in the balance as its direct consumption for the needs of communal living.

Therefore the indicated boiler room ought to be reported on form No 1-TEB or on form No 1-RTE, depending on its daily fuel and energy requirements (qualifications).

[Question] At a chemical combine sulfur is burned under boilers, as a result of which thermal energy is obtained, one portion of which is used to

heat production buildings, and another portion for electric power production; the electric power, in turn, is used for the needs of the combine, and a portion of it is transferred to the power system. Is it possible to consider the power obtained by burning production wastes (sulfur) as produced in utilization installations? How are thermal energy and electric power produced by sulfur combustion to be reflected in the balance?

[Answer] Steam and boiling water obtained from boilers as a result of the combustion of combustible wastes of production (wastes of chemical production--sulfur, wastes of the pulp and paper industry--sulfate liquor, etc) must not be considered thermal energy obtained in utilization installations although at some enterprises these boilers are erroneously considered utilizer boilers. In the given case a definite quantity of combustible wastes of production is expended on the production of thermal energy, and therefore it must be recorded in the balance as produced in industrial production boiler rooms.

Thermal energy is considered to have been obtained in utilization installations when it has been obtained in utilizer boilers, cooling installations, water heaters, etc, using only the following energy resources:

- a) heat transferred from the cooling system of production units (blast and open hearth furnaces, pyrite furnaces, gas generators, reheating furnaces, etc);
- b) physical heat of products removed in intermediate states of a technological process (the heat of incandescent coke, of heated metal or products of oil refining, of chemical products, the heat of cooling of liquors, of alcohol and yeast waste liquor, etc);
- c) physical heat of waste combustible gases of industrial furnaces, boiler units, the heat of waste slags, the heat of moist air from various drying units, etc;
- d) the heat of spent steam behind power unit-presses, of the steam lines of pumps and compressors, and also the heat of steam during the discharge of pulp and the heat of boiling of condensate.

Therefore a chemical combine shows the amount of sulfur combusted under boilers in the balance on form No 1-TEB, in section 4, in columns 2 and 4 of the resource part of the balance on the line "Other combustible wastes of technological production processes--total," with "Sulfur" written on one of the free lines of that section. In the distribution part of the balance the quantity of combusted sulfur proves to be proportional to the quantity of thermal energy and electric power produced by its combustion and is recorded in columns 6 and 7 of that section. The quantity of electric power produced is recorded in column 2 of section 5 of the balance on the line "Electric power--total" (code 16-000) and also on lines with interpretation codes 2 and 4 of column 2 of the indicated section (point 1) and

the quantity of electric power produced by the boiler installation is recorded in section 7 of the balance, in column 3 on line "Thermal energy (steam and boiling water)--total" (code 16-000) and, in addition, on lines with interpretation codes 1 and 2 of column 2, sections 5 and 7 (point 7).

In the distribution part of the balance the obtained types of energy are recorded in the columns corresponding to the direction of their use.

[Question] If at separate boreholes remote from the general-purpose networks there are mobile diesel electric power plants supplying electric power to drive the drills, which data should be reflected in the fuel-energy balance?

[Answer] If the capacity of the mobile diesel electric power plant is 5 kW or more* the diesel fuel expenditure must be shown on the balance on form No 1-TEB in column 5 as the expenditure "Electric power plants producing only electric power--for electric power production," and electric power used for drilling work, in column 20 "For direct consumption as fuel or energy" of that balance and in column 21 of appendix No 2 to it (on the line, "Electric power--total").

If the power of the mobile electric power plant is less than 5 kW, the electric power produced by it is disregarded and the expended diesel fuel is recorded in the balance on form No 1-TEB, in column 20 and in column 20-11 of appendix No 2.

[Question] If coal is obtained from the Central Coal Base, from which oblast should its receipt be shown?

[Answer] The receipt of coal from the Central Coal Base is recorded as receipt from the oblast in which that base is located. The name of the basin or deposit of arriving coal should be made clear at the base.

[Question] At an enterprise the heat of hot water or steam after use in a technological process heats fresh water which can be directed for use in the same technological process. Is it necessary to count that thermal energy obtained in utilization installations?

[Answer] The heat of hot water or steam after their use in a technological process and their use for a second time at a given enterprise in the same technological process or for any other needs is considered to be thermal energy obtained in utilization installations, regardless of whether there is a special utilization installation or the withdrawn heat is used without additional utilization installations.

*In accordance with the instructions for compilation of summary reports of electric power plants on forms E-1, approved by the USSR Central Statistical Administration on 31 August 1977, No 4-8].

[Question] In which columns of the balance and its appendices must geothermal and nuclear energy be recorded?

[Answer] Geothermal and nuclear energy are counted in the balance according to the quantity of electric power and thermal energy produced on the basis of them.

Because of different units of measurement of the obtained types of energy, the following lines are provided for recording indicators of electric power (1000 kWh) and thermal energy (Coal).

If a nuclear power plant produces only electric power, the quantity of nuclear energy is recorded in section II of the balance, on the first two lines of the position "Nuclear energy" (in 1000 kWh and tons of standard fuel) in columns 2,4,5 and 21.

During the simultaneous production of electric power and thermal energy the quantity of nuclear energy used for the production of electric power, the nuclear power plant records in section II of the balance, on the first two lines of the position "Nuclear energy" (in 1000 kWh and tons of standard fuel) and for produced thermal energy, on the third and fourth lines (in Coal and tons of standard fuel) in columns 2,4,7 and 21.

The quantity of geothermal energy used for electric power production is recorded in section II of the balance, on the first two lines of the position "Geothermal energy" (in kWh and tons of standard fuel) in columns 2,4,5 and 21. When geothermal energy is used for agricultural purposes (in hothouses) or municipal utilities (to heat housing), its quantity is recorded (in Coal and tons of standard fuel) on the third and fourth lines of the position "Geothermal energy" in columns 2,4,20 and 21 of the balance on form No 1-TEB and in columns 20, 20-17 or 20-18 of appendix No 2 to the balance (depending on the purpose of its use).

The electric power and thermal energy obtained from nuclear and geothermal energy are recorded in the corresponding columns 6 and 7 of the sections of the balance on form No 1-TEB.

[Question] In which column of the balance is the expenditure of coal used as an additive to the charge during glass founding recorded?

[Answer] Coal, the carbon of which plays the role of sulfate reducing agent and accelerator of the interaction of various components of the charge (sand, dolomite, nepheline, etc) is used as raw material for the production of non-fuel production and must be recorded in column 18 of the balance on form No 1-TEB.

[Question] Heating boiler rooms with a capacity of less than 20 Coal/hr, not a part of combined boiler and heating networks: are they recorded in section II of the reference part of the balance?

[Answer] Yes, on line 6, although the thermal energy produced by the indicated boiler rooms is not counted in the balance, the fuel expended by them is recorded as a direct expenditure of fuel on municipal utility needs in column 20 on form No 1-TES, and in column 20-18 of appendix No 2 to it, that is, in section II of the reference part of the balance, all the boiler rooms are counted, regardless of their capacity or purpose.

[Question] In which columns of appendix No 2 to the balance on form No 1-TES must a record be made of expenditures of fuel and electric power in thermal and electrical motors servicing industrial, agricultural, construction, municipal utility and other non-industrial work?

[Answer] Expenditures of fuel and electric power in engines directly driving working machines, mechanisms and hoisting and transporting equipment used in a technological process of industrial production, together with their expenditures in industrial furnaces, apparatus and other technological equipment connected with industrial production, are recorded in columns from 20-1 to 20-10 of appendix No 2 to the balance on form No 1-TES.

Expenditures of fuel and energy in engines servicing construction and installation work are recorded in column 20-11, in engines of transport equipment in columns 20-12 to 20-16, in engines servicing agricultural work, municipal utility needs, in column 20-18, other non-industrial work in column 20-19 of appendix No 2 to the balance on form No 1-TES.

[Question] Which types of fuel belong to "Other types of fuel" and in which units of measurement must they be shown in the balance on form No 1-TES and the reports on form No 1-RTS.

[Answer] "Other types of fuel" include:

1. Other natural fuel resources: lignites, peat meal, straw, cane, brushwood, tar-impregnated wood, bonfires, corn cobs and stalks, cotton-plant stalks and bolls, hulls, wastes of logging and woodworking (brushwood, bark, stumps, coniferous needles or branches, chips, sawdust, shavings and scrap) and also dismantled useless crossties, mine props, utility poles, wooden boxes, beams of dismantled old buildings, etc.

2. Other products of fuel processing: charcoal, semi-coke, peat coke, coal tar, coal-tar pitch, thermal anthracite, anthracene, commodity intermediate fractions of oil and gas refining, etc.

3. Combustible (fuel) secondary energy resources: secondary combustible gases of smelting furnaces (blast furnaces and cupolas, converter furnaces, etc), combustible wastes of chemical and thermochemical processing of carbon and hydrocarbon raw material (synthesis gas, waste gas of the production of technical carbon, waste gas of synthetic rubber production, wastes of electrode production, etc), wastes of tanning production unused or unsuitable for further technological production, steamer cinders, liquor

obtained from pulp and paper production and other wastes of technological production processes used as fuel.

In the balance on form No 1-TKB and the report on form No 1-KTE all the above-indicated types of fuel are shown in units of weight or volume in which they are counted at the enterprise (in the organization), received units are recorded, obligatorily, in column "B"; upon conversion to standard fuel all the indicators are recorded in tons.

[Question] What are distinctive features of completion of the balance on form No 1-TKB by oil refineries and petrochemical enterprises?

[Answer] Oil refineries record in column 2, "Produced in the report year," only finished oil products, as a rule. Intermediate fractions or distillates of oil products are included in the report balance only if they are subject to transfer to other enterprises for further processing, that is, are commodity production for the given plant, or have been obtained from outside for use as raw material. Transfer of intermediate fractions of one's own production from shop to shop at an oil refinery or petrochemical enterprise is not reflected in the balance, but the expenditure of oil and intermediate fractions of one's own production on the production of the fuel and chemical industry output is distributed correspondingly and recorded on the line "Oil (including gas condensate)" in column 12 or 18 of the balance on form No 1-TKB.

Thus the intermediate fractions of the production of oil refining, which are subject to transmission to the outside as commodity production for their further processing, are recorded in section III of the balance, on the lines "Other products of oil refining" in columns 2 and 4 of the resource part and column 24 of the distribution part of the balance. The intermediate products or distillates of oil products obtained from outside and used as raw material at a given enterprise are recorded on the above-indicated lines in columns 3 and 4 of the resource part and in column 12 or 18 of the distribution part of the balance, depending on the type of production.

[Question] Which type of petroleum products are counted and on which lines of the balance are petroleum products extracted during the report year from tanks during steaming recorded?

[Answer] Such petroleum products must be reflected in section IV on the line "Other combustible wastes of technological production processes--total" including one of the free lines of that section under the name, "Petroleum products obtained during the steaming of tanks."

[Question] If an oil sales organization has delivered and the user has received one petroleum product in the report year instead of another product, which types of petroleum products must be reflected in the balance?

[Answer] The oil sales organization and also the user record in their balances the types of petroleum products actually delivered and obtained, regardless of the stocks of petroleum products from which they were obtained. For example, if kerosene was received instead of diesel fuel, then the release of kerosene to the outside is recorded in the balance of the supplier and the receipt of kerosene (not diesel fuel) from outside in the balance of the user. Similarly, if diesel fuel was actually delivered instead of fuel oil, then diesel fuel is reflected in the balances of the supplier and user.

An exception is shale oil, delivered to users instead of fuel oil and recorded in the balances of suppliers and users on the line "Fuel oil"; on the same line the oil-refining enterprises record all intermediate oil-refining fractions of their own production (stripped oil, bottoms, direct distillation fuel oil, etc). In data on the volume of production (in column 2 of the balance on form No 1-TEB) the above-indicated shale oil and intermediate fractions of oil refining are also included on the line "Fuel oil."

[Question] At a metallurgical enterprise, besides an electric power plant producing compressed air there is a piston compressor which also produces compressed air that can be fed into a common collector and distributed along with the compressed air obtained from the electric power plant. What quantity of fuel expended on compressed air production must be recorded on the balance on form No 1-TEB?

[Answer] If the compressed air produced by electric power plants and piston compressors enters a common collector, then in column 8 of the balance on the lines of the corresponding types of fuel and energy is recorded their expenditure on the entire volume of produced compressed air, and in column 2 (section IV of the balance) the entire quantity of compressed air produced.

[Question] Do machine-building enterprises include in the balance on form No 1-TEB electric power produced in the report year by electric generators during the testing of internal combustion engines?

[Answer] The quantity of electric power produced by electric generators is recorded in section V of the balance, in column 2 on line "Electric power--total," and the expenditure of fuel or thermal energy on the testing of generators, in column 5 (as expenditure on electric power production). Similarly, the expenditure of fuel on the testing of internal combustion engines (if their mechanical energy is used for electric power production) is recorded on the appropriate lines in column 5 of the balance, and the electric power produced in that case, in section V of the balance, in column 2.

[Question] What is the procedure in filling in the balance on form No 1-TEB (on the lines for coals of the corresponding basins and deposits by coal-mining enterprises of the USSR Ministry of the Coal Industry?

[Answer] The coal-mining enterprises of that ministry which have coal-concentrating plants record in column 2 of the resource part of the balance on lines for coals of the corresponding basins and deposits the extraction of coal--gross (including coal losses during grading and concentration) accomplished on the territory of its oblast (krai, ASSR, or union republic without oblast division).

These enterprises record expenditures of coal for their own needs in columns from 5 to 20; coal losses together with rock during its grading and concentration (without consideration of sludge and intermediate product, delivered and used as energy fuel), in column 22; coal losses during storage and transportation to the enterprise itself, in column 23; the amount of coal transferred by sales organizations and delivered directly to users in accordance with the stocks allocated to them, after deduction of the amount of coal transmitted by coal-mining enterprises through sales organizations as stock allocated to them for their own needs, and also that released to the population and its blue- and white-collar employees, in column 24; coal residues at the enterprise, both those intended for its own needs and those not transferred to sales organizations at the end of the report year, in column 25.

In that case it must be borne in mind that from the data shown in column 22 only the amount of coal lost during grading and concentration is reconverted in terms of standard fuel.

The lost rock is not converted into standard fuel, as its caloric equivalent is equal to zero.

[Question] What is the procedure for filling in the balance on form No 1-TEB (on the lines "Natural gas (including casing-head)," "Other oil refining products" and "Other natural and casing-head gas refining products" by gas refineries?

[Answer] Gas refining plants which receive casing-head and natural gas from outside for further processing record their quantities in column 3 of the balance on the line "Natural gas (including casing-head)," and the unstable oil and gas condensate on the line "Oil, including gas condensate."

The broad fraction and products of oil stabilization obtained from outside, and also unstable gaseous benzine, must be recorded in section III of the balance, in column 3 on the lines "Other oil refining products" or "Other natural and casing-head gas refining products" (depending on whether the indicated products are obtained from oil or gas).

In the distribution part of the balance these products are recorded in column 13 as expended as raw material at gas refineries for fuel industry production.

Liquified gas, gasoline and diesel fuel obtained as a result of processing the raw material at those plants are recorded in section III of the balance, in column 2 on the appropriate lines, and also in columns of the distribution part of the balance, depending on the purpose of their use.

Stable oil shipped to oil refineries after its stabilization at gas refineries is recorded in column 24 of the balance on the line "Oil, including gas condensate," and the difference between the quantities of unstable oil received at the gas refinery and the shipped unstable oil as the volume of the expenditure as raw material, in column 13.

Intermediate fractions of oil- and gas-refining shipped to other plants for further processing (unstable and stable gaseous benzene, stabilization gas, the broad fraction of liquified gas, stable gas condensate, etc) are recorded in section III of the balance, in columns 2, 4 and 24 on the lines "Other oil refining products" or "Other natural and casing-head gas refining products" (depending on whether the indicated products were obtained from oil or gas).

Dry gas released by gas refineries into a gas pipeline for delivery to users is recorded in column 24 of the balance on the line "Natural gas (including casing-head)."

The quantity of natural and casing-head gas used for the plant's needs as raw material and fuel at a gas refinery must be equal to the difference between the amounts of gas received at the plant and the dry gas released to the gas pipeline network.

[Question] In which column of the balance on form No 1-TEB do the fuel trusts record coal removed from waste piles?

[Answer] The coal removed from the waste piles by personnel of fuel trusts is reflected in the balance in section I, column 2, on the line "Other types of natural fuel--total," and is recorded on one of the free lines under the name, "Coal removed from waste piles."

[Question] Do construction organizations reflect in the balance on form No 1-TEB oil obtained as bitumin and used by them in construction work?

[Answer] Oil obtained by construction organizations as bitumin must be shown in the resource part of the balance, in column 3 on the line "Oil, including gas condensate," and in the distribution part in column 19 (as expended as material for non-fuel needs).

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FUELS

PRODUCER, PIPELINER, REFINER COOPERATION RELATED

Moscow PRAVDA in Russian 18 Jun 80 p 2

[Article by PRAVDA correspondent A. Petrushov, Ufa: "From Well to Gas Pump"]

[Text] Many enterprises, organizations and scientific establishments in the Bashkir ASSR are involved in oil production, transport and refining. Across-the-board competition between related enterprises has made it possible substantially to improve quality at all stages of production -- from well production to the final product.

P. Ye. Ozerov, senior operator at the Novo-Ufimskiy Oil Refinery, has been dealing with oil for almost 30 years. His crew achieves high results every year. Petr Yefimovich works on an electric desalting unit, but he has studied every detail of the entire production process. And he is convinced that not everything is dependent on the skill and ability of the refiners -- it is also necessary that they have reliable backup. This is why Ozerov became one of the initiators of strengthening production ties between associated enterprises on the basis of combined competition. Representatives of the Bashneft' and Bashneftekhimzavody Production Associations, the Ural Products Line Administration, as well as the Bashkir Administration of the RSFSR State Committee for Refined Petroleum Products, and a number of scientific research and engineering design institutes signed an agreement under the slogan "From Well to Customer."

It is true that initially some of the competition participants had doubts. They said that each has his own goal: drillers -- number of wells completed and into production; producers -- tons of crude; refinery workers -- depth of refining, variety and quality of products, while transport workers think primarily about ton-kilometers.... But experience has shown that, placing the end results above all else, such diversified enterprises and organizations can be companions in arms.

Mutual socialist pledges formed the basis of the association. Oilfield workers pledged to improve delivery of crude oil and to raise its quality. Pipeline workers promised not to let substandard, mixed-grade crude get through to the refineries. The refiners resolved to increase output of

light refined products by further improving the refining processes. Scientists pledged to speed up development of improved refining processes. The agreement called for exchange of information on meeting mutual socialist pledges pertaining to monthly and quarterly performance results.

The party oblast committee gave its approval of this initiative. In order to increase the effectiveness of competition, the newspaper SOVETSKAYA BASHKIRIYA, together with volunteer inspectors, regularly conducts inspection tours, competitor roll calls, and competitor round-table discussions. A frank discussion of shortcomings makes it possible promptly to concentrate efforts on bottlenecks, flexibly and concretely to solve problems which arise.

Today the competition participants can already cite many examples of mutual assistance in difficult situations. For example, a shortage of boxcars and tank cars resulted in irregular shipping of finished product by transport workers. The refiners came to their aid: in short order they renovated at the refineries spurs and racks for taking on refined products, and constructed additional steam-cleaning stations. All this made it possible to boost railroad carrying capacity and reduce rolling stock turnaround time.

The pipeline people willingly cooperated with the producers in organizing pumping off and receiving drain-off water in the oilfields. These joint efforts have made it possible to improve the quality of the transported crude and to find a reliable source for water-flooding producing zones. The Ural Main Pipeline Administration took pains not to mix different crudes. This is very important for further processing of crude oil. Experts suggested and helped adopt a method of separate, sequential pumping of crude through a single pipeline.

In other words, combined competition eliminated ministerial lack of coordination to a significant degree and created an atmosphere of mutual interest and responsibility.

The Bashneft' Association, for example, has produced above target since the beginning of the five-year plan more than 6 million tons of "black gold." Almost 76 percent of crude oil going to the refinery is now of quality grades one and two. The enterprises of the Bashneftekhimzavody Association have increased by 120 percent the volume of product earning the Seal of Quality. Much has been done to reduce refined product losses and to protect the environment. The Bashkir Administration of the RSFSR State Committee for Refined Petroleum Products has increased crude oil transmission volume by almost one third in a period of four years. Scientific research and engineering design institutes have provided oilfield workers, refiners and transport workers with hundreds of schemes, designs, and recommendations, the savings from adoption of which amount to millions of rubles.

At the same time deficiencies have become more noticeable on the background of these successes. And the associated enterprises, which have felt the practical force of productive cooperation, are perceiving these shortcomings more acutely and with less complacency. Take, for example, the quality of crude oil. At present only one third of all produced crude is custody-transferred at top grade. This means that thousands of cubic meters of water and many tons of salts and mechanical impurities are pumped to the refineries together with the crude. They corrode equipment and increase crude oil losses.

What is hindering achievement of better results? One of the causes is that the oilfields are poorly outfitted with modern gauging and testing equipment. It is difficult even to name a type of instrument or device of which the geophysicists, drillers, and producers are not in need. Just criticism about equipment quality has also been leveled. Incidentally, there is no shortage of instrument models. Many have been successfully tested. But demand for new instruments is far from being met. The Ministry of Instrument Making, Automation Equipment and Control Systems has evidently not yet taken a hand, while the Ministry of the Petroleum Industry simply does not have the requisite manufacturing capabilities at its disposal. Unfortunately the Ministry of Chemical and Petroleum Machine Building's enterprises are also in no hurry to put into production equipment for the crude producers. But the problem must be resolved one way or another: instrumentation for oil workers is by no means a luxury....

There is another urgent matter. Producers are expending considerable material and labor resources on improving the quality of crude. Several years ago crude oil customers evaluated grade in a differentiated manner. For some time now, however, the system of providing incentive to improve quality of initial processing of crude by the producer has not been in operation. This has placed in a disadvantageous position not only the producers but also refiners. In the opinion of both parties, it would be advisable to return to the previously existing procedures.

We must add that the agreement on socialist competition among associated work forces contains no provision on material incentive. Obviously this must be taken into consideration in further development of labor competition. Also requiring improvement are the forms of moral incentive. Based on the quarter's performance results, the winning work force is awarded the challenge Red Banner of the oblast committee of the branch trade union and the newspaper SOVETSKAYA BASHKIRIYA. But the competition organizers do not yet have a definite opinion on measures to reward individual production leaders. There are problems with collection of information on competition progress, and there are flaws in the method employed to calculate its effectiveness -- hence the discrepancies which frequently crop up when totaling up performance results.

Probably meriting reproach here are the ministries and agencies and the central committees of the branch trade unions. They have unfortunately not gone beyond approval of the positive experience of the Bashkir oil workers.

But approval of initiative is only half the job. It is necessary to analyze more carefully competition progress, to take deficiencies into account, and to help correct them. There is also clearly a need for broader dissemination of the Bashkir experience. For example, each year local refineries are receiving more and more crude from Western Siberia, the quality of which does not always satisfy the refiners. Would it not be expedient for the Tyumen' producers also to participate in the combined competition? The competition should also encompass geophysicists, railroaders, and power engineers, who also determine to a considerable degree the smooth rhythm of the process conveyor from well to customer.

Socialist pledges for this year, adopted at a get-together of associated enterprises, attest to the increased maturity of the combined competition participants and their willingness to solve increasingly complex production problems. The form of labor interaction which they have found unquestionably meets the party's demands for improved work efficiency and quality in all areas. It is the direct obligation of the appropriate ministries and agencies, party and trade union committees to assist the development of competition concretely and in a businesslike manner, and to put into action its potential reserves.

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WAYS TO INCREASE TECHNICAL, ECONOMIC INDICATORS OF WELL CONSTRUCTION

Moscow NEFTYANOYE KHOZYAYSTVO in Russian No 5, May 80 pp 14-20

[Article by L. N. Shadrin, VNIIOENG: "Reserves of Growth in Technical and Economic Indicators of Well Construction"]

[Text] In the attainment of the planned indicators for extraction of oil and gas and rise in the industrial supplies an especially important role belongs to drilling, the leading fund-forming subsystem of the oil industry. At the same time, well construction is distinguished by considerable complexity that is due to the diversity of work, its high labor-intensity, energy-intensity and materials consumption of the production processes, which at the current stage is being aggravated by the movement of the drilling operations front to new, often economically poorly-developed, difficult to reach regions that have harsh natural and climate conditions. In addition, the drilling depths are rising.

According to the data for 1971-1974, in the structure of capital investments in the production sphere of the oil industry on the average 49.8% went for construction of exploratory and extraction wells [2]. Later the percentage of expenditures for drilling operations in the oil industry was somewhat diminished, although it remained high according to the total volume. Thus, in 1978, 38.4% of the total volume of capital investments into the oil industry was spent on construction of extracting and exploratory wells. Here the cost of the wells was about 60% of the total cost of the branch production funds.

The growth in capital investments into construction of wells, the dynamics for change in the physical volumes and other indicators for both purposes of drilling in 1965-1978 are presented in figure 1. Curves W and N reflect the trend of rapid increase in the volumes of penetration and the number of finished wells, which is governed by the need for advance growth of the branch's need for new oil and gas extracting facilities. If one examines the change in these indicators separately for the drilling purposes, then it is apparent, that the growth in the volume of well construction as a whole for the branch (59.5% in relation to the 1965 base) is linked to the

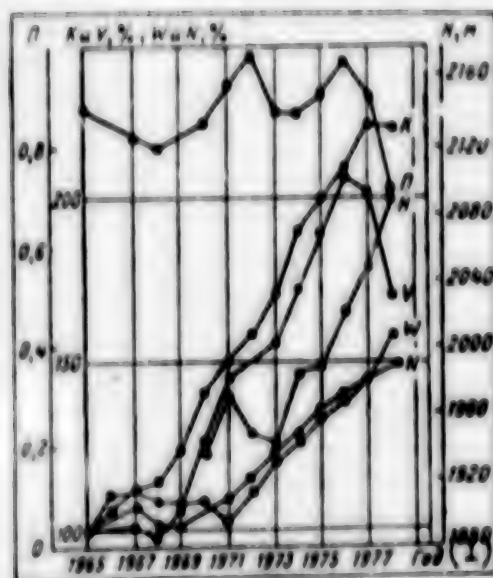


Figure 1. Change in Volumes of Well Construction for the Ministry of the Oil Industry

Key:

- Π --indicator of incomplete well construction
- K,V--change in volumes respectively of capital investments and incomplete well construction
- W,N--change in volumes of drilling and number of finished wells
- H--average depth of drilling
- l--year

primary increase in the volume of construction of extracting wells. In 13 years the volume of operational drilling on the whole for the branch increased 2.23-fold. At the same time, during this period the volume of exploratory drilling gradually dropped (annual footage and number of finished exploratory wells decreased respectively by 35 and 40.5%). A considerable growth in capital investments to well construction (see figure 1) was induced not only by an increase in the volume of drilling operations, but also by the implementation of a large program of technical re-equipping of drilling, provision with modern equipment, tools, special materials and chemical reagents.

Thanks to the technical re-equipping in the Ninth and Tenth Five-Year Plans the technical and economic indicators rose for the well construction. For example, only from 1970 to 1978, the annual volume of footage and the number of finished, constructed extracting and exploratory wells in the Ministry of the Oil Industry System increased respectively by 51.5 and 36.4%. At the same time, this was attained with a reduction in the average annual number of machines from 1124 in 1970 to 1013 in 1978 (by 9.9%). In this respect, a very positive trend is noted in the gradual reduction also

in the fleet of active drilling units--from 2083 to 2415 (by 8%). With an increase in the average depth of the extracting wells from 1772 to 1946 m the following rose: commercial drilling rate from 1120 to 1713 m/st. month; average footage per bit from 34.5 to 76.1 m and mechanical rate from 9.72 to 12.8 m/h. In exploratory drilling in this same period of time, with a growth in the average depth of the wells from 2941 to 2797 m the following were increased: commercial rate from 339 to 408 m/st. month and average footage per bit from 18.1 to 28.1 m, however the mechanical rate of footage dropped from 3.18 to 2.96 m/h.

If one examines the change in analogous data for both purposes of drilling, then a significant improvement is observed in all the technical and economic indicators of well construction. In particular, this is confirmed by the growth in the average output per one fleet drilling unit by 64.8%, one drilling brigade by 62%, and one worker in drilling by 46.3%.

An improvement in these indicators permitted a considerable overfulfillment of the assignment of the Ninth Five-Year Plan to improve the profitability of the drilling operations. In 1975, this most important economic indicator of well construction efficiency was increased not 1.5-fold as provided for by the directives of the 24th CPSU Congress, but 2.4-fold as compared to the corresponding indicator of 1970. The drilling plan on the whole was overfulfilled by more than 2.4 million m, the drilling organizations of the branch transferred more than 2700 oil wells above the plan to the customers.

At the same time, in addition to the growth in technical and economic indicators, during the analyzed period there was a fairly intensive increase also in the volume of incomplete construction of wells. After achieving the maximum amount in 1976 (see figure 1, curve V), it approached the corresponding annual volume of capital investments to well construction. Here the indicator of incomplete well construction (ratio of the volume of incomplete construction to the volume of capital investments to drilling) remained fairly high (although insufficiently stable) during 1965-1976.

This is explained by the situation that formed in the middle 1970's with the fund of wells being drilled and completed. Thus, in the beginning of 1976, only 39.8% of the wells were being directly drilled. Here, 10.5, 15.1 and 2.6% of the boreholes of indicated purpose respectively were waiting to be drilled, conservation and expecting liquidation. Of the fund of exploratory wells, only 26.7% were in the drilling stage. There were 2.3, 3.8 and 53.5% respectively in conservation, expecting liquidation and waiting to be put into operation.

A radical break occurred in the 10th Five-Year Plan, when, in fulfilling the decisions of the 25th CPSU Congress on acceleration of the well construction rates by 25-30%, the administrations of drilling operations undertook serious measures to reduce the number of wells expecting drilling, decrease their periods of testing and assimilation, accelerate the adoption of

decisions on conservation and liquidation, as well as for reduction in the periods of complete elimination of waiting for the wells to be put into operation. The conducting of these measures, in addition to the daily work to improve the technical degree of equipping of the drilling enterprises, permitted a reduction in the number of boreholes that were waiting for drilling and testing, respectively from 10.5 and 24.8% in the base 1975 to 7.1 and 13.2% in 1978 (with a rise in the total number of extracting wells being drilled by 19.8%). In exploratory drilling, the number of wells being drilled rose from 26.7% in 1975 to 53.3% in 1978, while the number of wells waiting to be put into operation dropped from 53.5 to 4.1% (with a decrease in the number of exploratory wells by 65.9%).

One consequence of the improved technical and economic indicators of drilling operations was a drop in the duration of well construction, which, according to the results of 1979, decreased both in total and separately for operational and exploratory drilling (as compared to the base 1975) respectively by 27.3, 25.6 and 13.9%. This achievement, that practically guaranteed the early fulfillment of the assignment of the 25th CPSU Congress to reduce the periods of well construction in the final year of the five-year plan by 25-30% became possible, thanks to the accelerated production of work in the fulfillment of all stages in the cycle of well construction. Thus, in 1979, there was a reduction in the duration of the following stages in the construction cycle separately for the extracting and exploratory wells, as well as on the average for the drilling purposes (as compared to the data of the base 1975): derricks and near-derrick structures respectively by 24.1, 12.5 and 28.6%; drilling and fortification of the extracting well by 0.9%, exploratory without change, but on the average by 13.7%; testing of beds and their development respectively by 52.9, 16.3 and 47.0%.

The reduction in the duration of well construction and improvement in the indices for the current state guaranteed a considerable reduction in the volumes (and corresponding indicators) of incomplete construction (see figures 1, 2 and 3). The trend for this reduction was set practically after 1976, when the results of conducting measures to reduce the duration of the well construction cycle began to have an effect.

The results of drilling operations in 1978 indicate that the indicators for incomplete well construction (figures 2, 3, curves Π) approached (especially in operational drilling) the standard indicators set in the branch for incomplete construction of extracting and exploratory wells (curve Π_w).

If this situation is maintained, then in 1-2 years the volumes of incomplete construction will correspond to the standards set in the branch, which will serve as an important prerequisite for guaranteed efficiency of planning, financing and organization of well construction.

In noting the growth in efficiency of drilling operations, it is necessary to indicate that well construction as the most fund-intensive sphere of

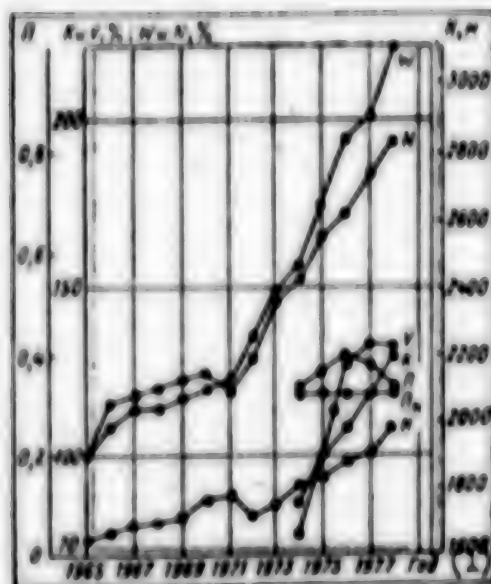


Figure 2. Change in Volumes of Construction of Extracting Wells for the Ministry of the Oil Industry

Key:

Π , K, V, W, N, H--the same as in figure 1

Π_n --standard indicator of incomplete well construction

activity is currently characterized by the availability of large reserves for a further increase in the technical and economic indicators, in particular, the most important of them, labor productivity.

In fact, if one traces the change in the main components of the balance of calendar time for well construction (for both purposes) during the 8-year period taken for analysis, then the nonproductive expenditures of time changed little, and yet very significantly. Here, both in the exploratory and operational drilling a trend was noted towards rise in time losses due to organizational standstills. At the same time, in recent years these time losses in operational drilling even rose somewhat (from 11.9% in 1965 to 13% in 1978).

In exploratory drilling a trend is traced for a certain growth in the time outlays for elimination of complications and decrease in the duration of work for elimination of accidents and defects (respectively from 2.6 and 13.8% in 1965 to 7.9 and 6.4% in 1978). Here, although in absolute amount the organizational standstills in exploratory drilling in 1977 dropped as compared to 1970 by 4%, their percentage in the balance of the calendar time remained 14-16%. The preservation of such a level of organizational standstills for a long time is the main reason for stabilization in the indicators of well construction rate in exploratory drilling.

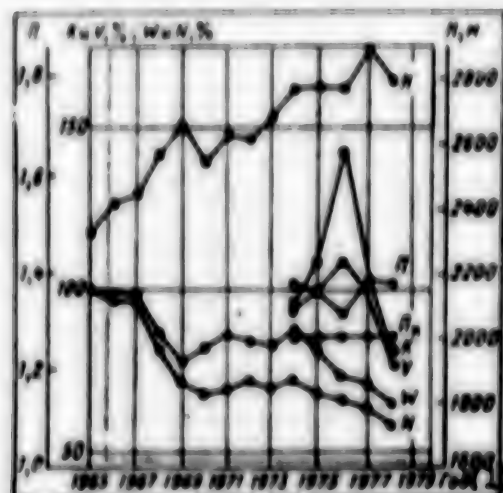


Figure 3. Change in Volumes of Exploratory Well Construction for Ministry of the Oil Industry

Key:

$N, K, V, W, N, H, \Gamma_u$, 1. the same as in figure 2.

At the same time, one should note that in the productive section of the balance for calendar time of drilling the high percentage of outlays for auxiliary work remains stable. In operational drilling, it rose from 25.3% in 1970 to 27.1% in 1978 (as compared to 23.3% in 1965), in exploratory--practically was stabilized on a level close to one-fourth of the entire calendar time for well construction (as compared to 26.4% in 1965).

A reduction in this stable part of the productive outlays of calendar time deserves special attention. Stabilization and even a certain increase in their specific volume in the operational and exploratory drilling are governed by a reduction in recent years in the total outlays of calendar time for drilling. For example, in 1978, these outlays for 1000 m of footage were reduced as compared to 1970 in operational and exploratory drilling respectively by 31.2 and 15.8%. However, the time expenditures for auxiliary work--electrometric, orientation of the drilling tool, preparation and regulation of the properties of drilling solutions, working of the shaft and others in many oil regions rose due to the increase in well depths, complication in geological and technical conditions, as well as increase in the percentage of meterage of the inclined-directed wells.

Nevertheless, there is still a real possibility for reducing these expenditures by means of a further integration of the electrometric measurements, the use of more advanced equipment and technology of manufacture, purification and processing of drilling solutions, their combination with work on penetration, optimization of the washing, working and shaft expansion patterns, accelerated installation and molding of the blowout preventing equipment, and other auxiliary work.

Analysis of the use of calendar drilling time made it possible to reveal also the trend in reduction of relative expenditures of time for work on penetration--from 35.6% in 1970 to 31.6% in 1977 in operational and from 33.0 to 31.2% in exploratory drilling. This means that the percentage of work that provides for penetration of wells gradually dropped due to the growth in specific weight of other outlays of calendar time. Here, attention is drawn to the growth in percentage of outlays of time for work to tunnel exploratory wells--to 34.7% in 1978 as compared to 31.2% in 1977, which was a consequence of the reduction in organizational standstills from 16.1 to 11.0%. In addition, among the elements of the average time outlays for penetration work a certain redistribution is also observed. In particular, a gradual increase in them for mechanical drilling from 16.9% in 1970 to 18.9% in 1978 in operational, and from 14.8 to 19.2%--in exploratory drilling. At the same time, there was a gradual reduction in the percentage of expenditures of calendar time for conducting descent-elevation operations, from 16.5 to 21.7% in operational and from 16.5 to 14.1% in exploratory drilling.

These results were attained by means of increasing the life and output of the new rock-breaking tools and face engines. At the same time, the lengthy absence of a noticeable rise in the specific weight of expenditures of calendar time for penetration work indicates that its efficient use due to the increase in life of the bits and face engines to a considerable degree is reduced due to organizational standstills, and the fulfillment of low-efficiency productive or nonproductive auxiliary work that does not produce footage.

All of this led to a rise in the cost of well construction. Thus, from 1965 to 1978, with an increase in the average depths of extraction and exploratory wells on the whole for the branch respectively by 20.9 and 20%, the cost of 1 m of footage rose respectively by 74.5 and 87.4%. The advance in the average rates of growth in the cost of 1 m of footage as compared to the rates of increase in the average depths of the wells is explained by the nonproportional depth of complication of the geological-technical and hydrothermobaric conditions of drilling, as well as the gradual movement of the mass well construction into the distant regions of West Siberia, European north, and other regions of the country with poorly developed production and social-economic infrastructure. The influence of these factors explains the change in the quantitative correlations of the components in the actual net cost of 1 m of well footage in the Ministry of the Oil Industry. In particular, the specific weight of the preparatory work in the structure of net cost of 1 m of extracting wells increased from 3.1% in 1965 to 4.4% in 1970, and then to 12.1% in 1978. The percentage of transportation expenditures rose during this period from 5.7 to 8.6%. The growth in the specific weight of these components of net cost is linked to a considerable rise in the volumes of preparatory work and transportation maintenance of drilling and auxiliary enterprises in the fulfillment of large well construction

programs in the country's regions of difficult access. In addition to this, a reduction in the duration of well construction, as well as the growth in rate indicators of drilling and finishing of the wells led to a considerable reduction in the percentage of net cost linked to the operation of drilling equipment and tools, from 24.1% in 1965 to 16.8% in 1978.

As for the net cost of 1 m of footage in exploratory drilling, then in the structure of this indicator a relatively small increase occurred in the percentage of cost of the expended materials, from 16.1% in 1965 to 19.4% in 1978 (mainly due to the increase in the percentage of cost of the casings from 4.0 to 6.4%), but the transportation costs rose from 7.0 to 10.1% and the expenditures for field-geophysical studies--from 3.2 to 4.8%. At the same time, the percentage of net cost linked to the operation of drilling equipment and tools was somewhat diminished, from 32.6 to 20.6%.

The decrease in the percentage of overhead in the net cost of drilling both extracting and exploratory wells is mainly linked to a reduction in the relative dimensions of the administrative-economic expenditures due to enlargement of the drilling enterprises as a result of the program for perfection of the organization of production and control of well construction in the branch that was implemented at the end of the 1960's and early 1970's.

It should be noted, that the correlation of components in the structure of the actual net cost of footage in exploratory drilling during 1965-1978 changed to a lesser degree than in the operational. This, apparently, is linked to the noted considerable reduction in volumes of construction of exploratory wells (see figure 3). Moreover, in recent years the volumes of exploratory drilling done by the enterprises of the Ministry of the Oil Industry, are in the old oil regions for the most part (pre-exploration of productive facilities and exploration of new fields). Thus, according to the results of 1978 the volumes of exploratory drilling in the regions of activity of the Glavtyumenneftegaz [Main Administration of Tyumen' Oil and Gas Industry], associations of Tomskneft', Komiineft' and Udmurtneft' were respectively 2.4, 2.2, 1.9 and 1.5% of the total footage in these regions. At the same time, on the whole for the branch, the percentage of exploratory drilling reached 16.5%.

All of this indicates the reserves for increasing the technical and economic indicators for well construction, which is confirmed by the great gap between the average indicators of labor productivity of the low production links of the drilling enterprises and the corresponding indicators of the leading drilling brigades that are included in them (see table).

For example, in 1978, the brigade of drilling foreman G. G. Skladchikov that was included in Nefteyugansk UBR [drilling administration] No 2 with productive time of 88.5% drilled 52,377 m of wells. At the same time, the corresponding average indicators for operational drilling in this UBR were: productive time 75.4%, average footage for drilling brigade 39,184 m. In commercial rate the leading brigade leads its UBR almost by 1000 m/st.month.

(1) Организации и бригады в их составе лучшие бригады	(2) Цель бурения	(3) Средняя глубина сква- жины, м	(4) Коллективная скорость бурения, м/ст.мес.		(7) Время бурения, ст.мес.	(8) Средняя глубина сква- жины, м
			(5) планируемая	(6) фактическая		
	(9)					
(11) Юганскнефтегаз	Эксплуатация	2566	1561	2419	56.3	33743
(12) Нефтеюганское УБР № 2	"	2612	1597	4742	48.4	39184
(13) Бригада Г. Г. Складчиков	"	2620	1617	5231	65.3	52397
(14) Татнефть	"	1652	9129	2096	74.4	22364
(15) Альмотьевское УБР	"	1619	2090	2057	75.5	23008
(16) Бригада Л. М. Нурутдинова	"	1673	2140	2489	90.3	31028
(17) Азнавское УБР	"	1622	2220	2227	75.0	24130
(18) Бригада М. П. Гриня	(10)	1536	2530	3029	94.8	31834
(19) Эфланефть	Разведка	2624	258	346	59.1	4058
(20) Валикишское УБР	"	3506	300	470	64.5	5403
(21) Бригада Н. А. Кузнецова	(9)	3810	567	671	81.7	7380
(22) Уренское УБР	Эксплуатация	3389	345	381	79.6	3773
(23) Пляжское УБР	"	3882	376	447	79.6	3545
(24) Бригада В. А. Пляко	"	3780	482	1034	98.1	8831
(25) Акнефть	"	1908	160	516	70.2	5211
(26) Али Байрамлинское УБР	(10)	2100	674	495	67.5	5042
(27) Бригада А. А. Гасанова	"	2150	500	942	98.4	7832
(28) Ставропольнефтегаз	Разведка	3805	550	727	83.0	8958
(29) Нефтекумское УБР	"	3823	580	757	77.6	3100
(30) Бригада С. Р. Раскуев	"	4450	618	811	92.4	8306
(31) Уфимнефть	"	3769	240	241	73.8	2419
(32) Андиманское УБР	"	4542	240	271	85.6	2776
(33) Бригада Т. Турсунова	"	4490	346	432	93.0	4490
(34) Саратовнефтегаз	"	4032	200	210	53.2	1829
(35) Саратовское УБР	"	3622	245	269	56.2	1432
(36) Бригада А. К. Шевченко	"	5000	361	453	92.3	3350
(37) Степновское УБР	(9)	2842	166	164	47.3	1116
(38) Бригада П. К. Ломовина	"	2583	294	443	89.4	3902
(39) Нижнекамскнефть	Эксплуатация	2023	706	689	71.0	6622
(40) Арчединское УБР	"	3012	650	696	77.4	6211
(41) Бригада Д. А. Рыбалкина	"	3170	798	714	83.1	9063
(42) Оренбургнефть	"	2391	1225	1306	75.6	11768
(43) Спасское УБР	"	2481	1133	1281	74.4	12161
(44) Бригада А. И. Емельянова	"	2474	1312	1765	91.6	15049
(45) Кимнефть	"	2615	796	791	71.2	7843
(46) УБР № 2	"	3338	876	951	81.4	8790
(47) Бригада С. В. Мелехина	"	3272	883	1433	95.0	13129

Key: Key:

1. Organizations and best drilling brigades in them
2. Purpose of drilling
3. Average depth of well, m
4. Commercial drilling rate, m/st.month
5. planned
6. actual
7. Productive time, %
8. Average footage for brigade, m
9. Operational
10. Exploratory
11. Yuganskneftegas
12. Neftoyugansk UBR No 2
13. Brigade of G. G. Skladchikov
14. Tatneft

15. Al'met'yevsk UBR
16. Brigade of D. N. Nurutdinov
17. Annakayevo UBR
18. Brigade of M. P. Grin'
19. Enbaneft'
20. Balykshi UBR
21. Brigade of N. A. Kuznetsov
22. Uknneft'
23. Poltava UBR
24. Brigade of V. A. Pilko
25. Asneft'
26. Ali-Baryramly UBR
27. Brigade of A. A. Gasanov
28. Stavropol'neftegaz
29. Neftekumsk UBR
30. Brigade of S. B. Rassuyev
31. Uzbekneft'
32. Andizhan UBR
33. Brigade of T. Tursunov
34. Saratovneftegaz
35. Saratov UBR
36. Brigade of A. K. Shevchenko
37. Stepnovskiy UBR
38. Brigade of P. K. Lomovtsev
39. Niz'nevolskneft'
40. Archedinskiy UBR
41. Brigade of D. A. Rybalkin
42. Orenburgneft'
43. Sorochinsk UBR
44. Brigade of A. I. Yemel'yanov
45. Kombineft'
46. UBR No 2
47. Brigade S. V. Melekhin

There is even a greater difference in the indicators of the brigade for the drilling foreman M. P. Grin' (footage of 31,874 m/year with commercial rate of 3029 m/st.-month and productive time of 94.8%) with average indicators of the drilling brigades of the Annakayevo UBR (footage for drilling brigade of 24,130 m with commercial rate of 2227 m/st.-month and productive time 79%).

With comparability of the geological and technical, and infrastructure conditions for conducting drilling operations, the emergence of a discrepancy in the average and individual technical and economic indicators to a considerable degree is linked to the influence of such factors as individual occupational and moral-psychological qualities of the drilling foreman, the organizer of production, and the educator, the qualification of the leading brigade workers, permanence of its composition, good teamwork, ideological-political unity, and social-general good management of

the labor collective members. At the same time, the considerable gap in the indicators of the leading brigades from the average drilling enterprise to a certain degree indicates the insufficiently effective operation of the engineering and technological services (ETS) and the specialized subdivisions and specialized subdivisions that are responsible for the organization and production-technical maintenance of well construction. Often, the leaders of the leading brigades themselves create the conditions for guaranteeing continuity in the drilling process and great advances are made thanks to the fact that they assume the realization of functions that are not fulfilled to a complete measure by the control apparatus and the specialized services of the drilling enterprise and the production association. In this sense, the increase in responsibility for the successful operation of all the drilling brigades should be viewed as a reliable reserve for increasing the output for each brigade.

In addition, large reserves for improving the technical and economic indicators of drilling can be introduced due to an increase in the efficient operation of the ETS of the drilling enterprises in the area of realizing the progressive engineering and economic decisions in the technical plans for well construction, as well as the timely detection and correction of the not quite successful planned solutions in the subsequent planning.

The technical, technological, organizational and social-economic reserves to guarantee continuous well construction, increase in the percentage of the productive portion of the calendar time balance, reduction in the net cost per 1 m of footage, and increase in the quality of the extracting and exploratory wells as mining-technical structures are so diverse, that it is not possible to give a complete analysis of their effect on the drilling indicators in the framework of the given article.

However, based on the analysis made above of changes in the technical and economic indicators for well construction, the realization of reserves for increasing the efficiency of drilling operations must be activated in technical, technological and organizational directions.

The technical includes perfection of well designs with an accent on their simplification and lightening; increase in the substantiated selection of load capacity and power of the surface drilling and power equipment, type sizes of the rock-breaking tools (bits), face engines, sets of drilling tools, casings and other oil field pipes, equipment for the well head, etc.

The technological includes increased substantiation of the drilling patterns; perfection in the methods and technological procedures for regulating and stabilizing the structural and mechanical properties of the drilling solutions by treating them with chemical reagents and timely mechanized purification; regulation of hydrodynamic counterpressure on the face and

walls of the shaft; optimizing of the rates of descent and elevation of the drilling tools, and descent of the casings, patterns of washing and their cementing; implementation of measures to prevent geological and technological complications and accidents at all stages of drilling and finishing of wells, and other processes of well construction.

Organizational includes timely provision of the objects of well construction with quality planning and estimated documents; continuity in the production and technological control of all work on the construction cycle by timely creation of normal social-general and production conditions; guarantee of a reliable engineering-technological, transportation and continuous information service for the well construction facilities; timely putting into the production cycle of working groups of the necessary specialized subcontract organizations and other questions that are linked to guaranteeing the constancy of the qualification structure and number of personnel of the low production links, increase in the qualification of the ETS, organization of the educational work, etc.

The development and persistent introduction of measures for realization of it but only the list reserves for reducing time outlays by increasing the engineering and economical substantiation of the technical, technological and organizational solutions will help to significantly improve the technical and economic indicators of well construction with the extant technical equipping of the drilling operations.

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FUELS

EXPLORATORY DRILLING FOR OIL IN AZERBAIJAN

Baku VYSHKA in Russian 3 Jul 80 p 2

[Article by S. Nagiyev, chief of drilling operations of the Gobustan URB (Upravleniye razvedochogo byreniya) Hero of Socialist Labor: "Deep Exploration"]

- [Text]
- Where they are prospecting for more oil.
 - Why drilling quality and speeds are still low.
 - Problems that require solution.
 - Commitments of an advanced brigade in honor of the forthcoming forum of communist countries.

Almost 4 years ago our brigade transferred to the new area of Amirarkh, which is in the Agdash region, where drilling of a first appraisal well was undertaken. It also marked the start of long and difficult searches for oil and gas deposits at a promising storehouse which has, in the geologists' opinion, a structure similar to that of the Muradkhanly and therefore is favorable for the accumulation of nature's fuel.

Drilling holes in poorly studied regions is an ordinary affair to us. But the Amirarkh region, I was told, is "precipitous" in nature. Complications arose in the most unexpected zones. However, the brigade, relying on the experience that had been gained and on assistance from our administration's specialists, was able to bring the hole successfully to the designed level--4,200 meters, and then, by virtue of geological necessity, to deepen it another 1,000 meters and discover Upper Cretaceous sediments, all this work being completed 4 months prior to the planned deadline.

The first hole, although it did not reveal deposits, nevertheless gave much that was valuable. In particular, it expanded our notions about the new region, and the main thing was that it added to our experience those crumbs of knowledge that helped to overcome more successfully the difficulties that arose during drilling of the next hole, No 3.

Penetration under the intermediate casing, where we ran across, first watery formations and then fractured formations, in the profile of one zone, caused us especially great trouble. Each time, the danger of drill-tool sticking arose. But competent treatment of the flushing fluid with the

newest, effective chemical reactants, which was performed by the builders' shifts of Gyl'nazar and Khankishcha Balakishiyev and by Sab' Kurbanov and Kurbanly Kurbanov, enabled complications to be avoided, and the well bottom to be brought down to 4,600 meters. It should be noted that, for the first time in exploratory-drilling practice on dry land, we succeeded here in bridging over the greatest interval--1,865 meters--with intermediate casing.

During the work we got to know the depths of this area and its peculiarities. One of them was high formation temperature. Measurements made at a depth of 4,846 meters indicated that it went up to 135 degrees Celsius. This sharply degraded flushing-fluid quality and the execution of plugging work while the casing string was being plugged back. But this task was successfully solved by AzNIPneft' [Azerbaijan State Scientific-Research and Design Institute of the Oil Industry] specialists. The chemical reactants now being used, upon the institute's recommendation, will increase drilling-mud stability in the anomalous medium, providing for better condition of the well bore.

Besides us, two other brigades are now working in Amirarkh. The penetration of hole No 3, which our collective is accomplishing, is going successfully. We have reached the 5,320-meter level well ahead of schedule. By reducing operating costs per meter of penetration for two holes, more than 500,000 rubles were saved, which was severalfold greater than the adopted commitments.

But nevertheless, the results achieved do not give us full satisfaction. And here is why. Personally, I considered the main criterion of the explorers' work to be not the meters of penetration, even though it is above plan, but the oil obtained from the depths of the new area. It is true that in the preceding 4 years our URB [sic] collective discovered the Kalamatdinskoye and Duzdag-Gedakbezskoye deposits. An influx of fuel was obtained at the Amirarkh area during the testing of hole No 2. The drilling through of hole No 1 in the Demirtape-Udabno area last year established the presence of oil and gas in Eocene sediments of that area. There are good indicators also in other regions. But we still do not have large amounts of oil, and, in my view, we are not always successful in drilling holes of good quality to the designed levels and in testing them. And this requires a critical look at the oversights and deficiencies that still exist in our work.

Take, for example, the testing of facilities by means of formation testers. This equipment has proved itself well. Suffice it to say that in 4 years its use has saved 500,000 rubles. Apparently there are no problems of any kind. But actually there are. As experience indicates, the use of formation testers at great depths where there are depressions in the formation is fraught with no few dangers. For example, in the Amirarkh area, while testing a feature beyond 5,000 meters in hole No 2, the formation tester stuck. I think that for this reason it was not possible to master a promising formation in Upper Cretaceous sediments. Something similar also happened in the Zardob area. Where and how to use

formation testers is a problem, the solution to which all of us--operators and scientists--should give proper thought.

Serious complaints also should be registered against geological parties of Azneftegeofizika [Azerbaijan's Administration of Geophysical Exploration of the Ministry of Petroleum Industry], which serves the drill rigs of our area. As a rule, it takes them a long time to come, they go on a work binge when preparing the equipment, and frequently their work is faulty. Through their fault we spent much time extracting a tool that had been left in hole No 3 through the negligence of the geophysicists. Many such examples can be cited. All this, naturally, cannot help but be reflected in the quality of our work.

We spoke about the sort of complexities the drillers encounter in their work. This also happens when a deviation of the hole occurs spontaneously during drilling. At one time, AzNIPIneft' staff workers tested 18 configurations at the end of the drilling tool at the Sazhdag and Mamedtape areas. The most successful of them were recommended to us. And still bore deviations of up to 10-12 degrees occurred in holes. This causes a fluted working, which often is the cause of serious complications and even of accidents. The oil explorers hope that the scientists will make more efficient recommendations for the drive against well-bore deviations and will give thought to further improving the technology of deep drilling under complicated geological conditions.

Our country has now created and is producing serially many good rock-destroying tools in practically all sizes. However, the quality of some of them leaves something to be desired. For example, the 2IRG bits with the brand of the Baku Machinebuilding Plant imeni Kirov. They wear out quickly in the tough rocks of Amirarkh. At a depth of 5,120-5,200 meters, one bit yields 5-6 meters of penetration and in some cases even less. Round-trip operations have to be performed more often, and each such trip puts wear on the equipment and reduces labor productivity. Meanwhile, penetration speed could be raised greatly if diamond drills or bits reinforced with the superhard Slavutich alloy were used in tough rock instead of the three-cone bit. But we have neither of these tools.

In speaking about this, one cannot help but recall the small-diameter core bits that are being used in the lower productive zones of the profile. The need for them is very great. Because of the lack thereof, for example, we were not able to recover the core at the bottoms of hole No 1, and this, we shall say it directly, deprived the geologists of valuable information about the composition and productivity of rocks we discovered in the Amirarkh area.

And the condition of the keyseat system does not meet today's requirements. The fact is that, as the depths of exploratory holes increase, the demand for flushing-fluid quality grows immeasurably. Therefore, we need two-stage vibration screens with coarse and fine cleaning. We have two sets of this system, but we cannot use them right now for lack of spare parts. It is a case of poor management. But who is guilty here? It

would seem that the appropriate organizations should show greater exactness toward the manufacturing plants. It is their duty to ship the necessary spare parts and separate components and spare parts therefor, together with the basic equipment, and they bear responsibility, along with us, for interruptions in the schedules for drilling holes.

In brief, there are many problems. And they must be solved as quickly as possible. This is important because in the near future it is planned to expand exploratory operations in the Amirarkh, Zardob, Demirtape-Udabno and Gyurzundag areas and at other structures between the Kura and Iori rivers, and to give the country, finally, more oil from West Azerbaijan.

Our brigade, and the whole collective of the Gobustan URB received with great inspiration the news about the convocation in February of next year of the regular 26th congress of our Leninist party. The forthcoming forum of communist countries has been called upon, as Comrade L. I. Brezhnev said in his report to the June Plenum of the CPSU Central Committee, to determine the strategy and tactics of the drive during the approaching stage of building communism.

In reflecting on this, it is better that you visualize those tasks on the solution of which the Soviet people should concentrate their efforts. For us, the drillers, it consists in more rapidly discovering new deposits of oil and gas and in placing them at the motherland's service, strengthening thereby the country's fuel and raw-materials base. And the fulfillment of this task is a cause of our anxiety to raise the effectiveness and quality of drilling.

Socialist competition in honor of the congress and the exchange of advanced work experience should play a major role here. Unfortunately, we do not always pay the required attention to these questions. Our brigade, for instance, changes the rotary drill line in 2½ hours, while other brigades spend 8-10 hours on this work. Our experience is good but not by far does everyone know about it. What a large reserve for accelerating matters lies under the bushel! As many examples of this as you please can be cited.

Five years ago, in the days of preparation for the 25th CPSU Congress, a competition was promoted among our collective and underground explorers from an East Georgian URB for the most rapid possible assimilation of the oil and gas deposits of East Georgia and West Azerbaijan. This labor rivalry brought no few benefits to both us and our Georgian friends. However, recently it has been necessary to say directly that the competition between our collectives has weakened. Yet we are all solving one and the same task—we are searching for oil and gas deposits at identical geological sediments. And mutual enrichment with advanced experience is especially necessary here for achieving the planned goals.

At the CPSU Central Committee Plenum Comrade L. I. Brezhnev emphasized that maximum energy must now be directed toward successfully fulfilling and overfulfilling the plan for the concluding year of the Tenth Five-Year

Plan and providing for stable operation in the national economy during 1961--the first year of the Eleventh Five-Year Plan. Our whole collective of the administration of underground explorers has adopted these instructions as guidance for action. Our brigade in particular has committed itself to carrying out the 1960 plan by 7 October--USSR Constitution Day--and to completing work on hole No 3 four months ahead of the stated deadline. Many other brigades have planned high goals. All of them have one ambition--to prepare worthy labor gifts for the congress of our own communist party and to make our contribution to execution of the party's plans.

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FUELS

TYUMEN' OIL, GAS FUTURE DISCUSSED

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 12 Jul 80 p 4

[Interview with Farman Salmanov, chief of Glavtyumengeologiya, by SOTSIALISTICHESKAYA INDUSTRIYA correspondent V. Noskov: "Oil Is Born... in Debate"]

[Text] It was he who led a team of geologists to Surgut, confident that they would find oil. He, Salmanov, is rightly considered to be the discoverer of the Surgut and Ust'-Balykskoye, Meglonskoye and Pravdinskoye oilfields.... Today Farman Kurban-ogly Salmanov is a Hero of Socialist Labor, a Lenin Prize recipient, deputy to the RSFSR Supreme Soviet, chief of Glavtyumengeologiya, and a Doctor of Technical Sciences.

[Question] Farman Kurbanovich, today writers, film makers, journalists and artists are devoting considerable attention to Tyumen' and the people who work here. How accurately, in your opinion, do they reflect in their works the problems, events and life in this region?

[Answer] That's right, we can't complain of inadequate attention, and that is quite understandable. The Soviet people are interested in how the oil workers of the famed Samotlor, the gas field workers of unique Urengoy, the construction workers on the Surgut-Urengoy main rail line, the geologists of Yamal, and the fishermen of Salekhard live and work. Today Tyumen' is one of this country's "hottest" spots. Without it one could not conceive of the Soviet economy today. In connection with this I should like to emphasize that many debatable, and I would say even at first glance fantastic ideas have been settled affirmatively with the aid of writers and journalists. And on the other hand, many foolish actions have not taken place. Take the following example. When geologists proved that there were large oil reserves along the Middle Ob', debates began on how to bring it out of the ground. The fact is that the entire area is covered by impassable marshes and swamps, which do not freeze solid even in the coldest Siberian winter. The experts proposed many plan variants. According to one of them, the entire Tyumen' North was to be flooded with

water and oil to be drilled from floating rigs, such as the oilmen of Baku employ, for example. Today this "idea" seems utterly ridiculous. But at the beginning of the 1960's we had to prove it with hard facts. Writers and journalists helped. There are many such examples, but what is typical is that in today's publications and movies about Tyumen', preference is given to the sharp-conflict situations which occurred in the early days of development of the Tyumen' region. You read a book or see a movie and wonder why they can't tell about the contest of opinions taking place at the present, second stage. There are just as many debates and conflicts taking place today, in which the truth is born, sometimes involving considerable tribulation. And they should write not only about production but also about man's development as a person, an individual, in the extreme conditions of the North. At these latitudes it is sometimes so cold that metal will shatter like glass. Metal cannot withstand the cold, but it does not seem to bother man. But there occur situations which present real problems. Not due to work or the cold, but because those around you do not understand and do not want to see those results which can be obtained from implementation of your idea. And if one has no support, nobody who would see that you are striving not for personal advantage but for the common cause, things then become difficult.

[Question] You maintained in your senior thesis at the beginning of the 1950's that Tyumen' contained oil and gas. You subsequently defended this idea in a practical manner, in spite of the opposing views of other experts. Where did this faith come from?

[Answer] I am frequently asked what roots bind me, an Azerbaijani, to Siberia? In my youth I read several studies by Academician Gubkin, who insisted that a search for oil should be conducted east of the Urals. While still enrolled at the Azerbaijan Petroleum Institute, I took three trips for practical experience to Western Siberia, where I traveled hundreds of kilometers in the company of geologists. After completing my studies I asked to be sent to work in this region because I was convinced that there was definitely oil here. I once argued my convictions quite heatedly at an important scientific meeting. I had not yet finished when a renowned expert on Western Siberian problems who was present interrupted me: "What is your name, young man?" "Salmanov." "I don't know any Salmanov." I realized that my opinion, that of a rank-and-file geologist, bore no weight.... I had to convince them not with words but with deeds. Working together with dozens, with hundreds of geologists of like mind, we discovered oil and gas fields, which now total about 200 in Tyumenskaya Oblast.

[Question] Today Tyumen' called the country's main fuel-energy base. We know that in the coming decade it will provide the bulk of oil and gas production growth. What about the years beyond?

[Answer] I have already stated that there are just as many debates going on at the second stage of development of Western Siberia, especially on how we should conduct development of the oil and gas fields here. Some

experts propose production at a rate which would leave reserves for future generations. I personally have nothing against this. It is the sacred obligation of every citizen to give thought to those who will live after us. But I cannot agree with those who argue that we have reached a peak volume of oil and gas production in Tyumen'. I might recall that this year our country will receive from this region more than 300 million tons of crude oil and more than 150 billion cubic meters of gas. Many feel that this is the limit. But only approximately 20 percent of the land in the North has been thoroughly investigated. And this 20 percent involves primarily the Middle Ob'. But what lies hidden beneath the Yamal and Gydanakiy peninsulas? This is a matter for future investigation. Our geologists have struck oil not only north of Samotlor but also over a vast area of the Yamalo-Nenetskiy District. Discovery there of the Vostochno-Tarasovskoye, Muravlenkovskoye, Yen-Yakhinskoye and other fields makes this a very promising area. We have also obtained promising results in the southern part of the Yamal Peninsula.

[Question] But now it must be easier for you, head of the country's largest team of geologists and a scientist with a widely-known name, to implement your ideas.

[Answer] You see, here is the way it is. Before I did not have such support, but my opponents were also not higher than a main administration head. Now I myself occupy this position. And I must bring my arguments to those who shape the plans, who implement policy in a given branch. I would also like to emphasize the following. It is a good thing that not only optimists but also experts who are called pessimists are participating in this interesting business. Both optimists and pessimists give one another no rest, and this results in valuable suggestions and ideas. It is true that optimists, who are discovering new fields, predominate in our work force.

[Question] Farman Kurbanovich, in the most recent elections you were elected deputy to the RSFSR Supreme Soviet. Now in addition to your concerns with production, you would evidently have other concerns demanding your attention.

[Answer] I realized that when I was meeting with my constituents. Having analyzed the instructions of the voters with the main administration party organization, we have now proceeded to carry out urgent requests. This year it has been decided to double housing construction. We shall build an outpatient clinic, a kindergarten, a school, and two school boarding facilities: one in Tyumen' and the other on the Black Sea coast. As I have already stated, many of our teams are working in the Arctic. In order to provide fresh vegetables to persons located at distant latitudes, we want to build a greenhouse there, which will be the largest in the Tyumen' North. I sometimes hear complaints from people in the field parties that they are rarely visited by actors, writers, and singers. As a deputy I naturally shall endeavor to establish contact with people in the arts.

FUELS

KAZAKH WORKERS, WESTERN SIBERIAN OIL, GAS COMPLEX DESCRIBED

Moscow IZVESTIYA in Russian 31 May 80 p 2

[Article by IZVESTIYA correspondent based on interview with O. Miroshkhin, Central Committee Secretary, Communist Party of Kazakhstan: "Labor Cooperation"]

[Text] O. Miroshkhin, secretary of the Central Committee of the Communist Party of Kazakhstan, related to an IZVESTIYA correspondent participation by Kazakhstan workers in further development of the Western Siberian Oil and Gas Complex.

At the beginning of May the Central Committee of the Communist Party of Kazakhstan, jointly with the Kazakhstan Council of Ministers, drew up an extensive and concrete program to lend practical assistance to the Siberians. It specifies a large aggregate of measures, which will make it possible to carry out the principal task assigned us -- to build in Western Siberia a 120-kilometer haul road. The road will be located in the northwestern part of Tomskaya Oblast -- running from the village of Aleksandrovskeye in the direction of the Olen'ye field. These localities are adjacent to swampy and taiga areas of Tyumen'. The conditions are difficult, and every kilometer of route will require considerable material expenditures and a maximum of organizational effort.

Living quarters, warehousing and supply storage, community and public food service facilities, and a medical facility will be built in the village of Aleksandrovskeye. It will contain a transshipment depot to receive and forward construction and other supplies.

Meriting particular attention is the fact that a special trust, Kazneftedostroy, has been established in the republic road system, proceeding from the scheduled volume of work in the area of the oil and gas complex. One of the trust's administrations is already in operation -- construction mechanization. A production supply administration, worker supply division and housing-municipal division have also been organized and set up in Aleksandrovskeye.

One can state that at the present time we are counting not in months but in weeks, and even in days. The fact is that the principal flow of goods from Kazakhstan should run down the Irtysh and Ob', while the navigation season is short -- running from mid-May to the beginning of October. It is necessary during this comparatively short period of time fully to complete shipping of goods, equipment and materials which will be required for all jobs -- those which will start before winter begins and those which will get under way during the long Siberian winter. This is why it is absolutely essential to build as quickly as possible such an essential production-technical facility for the newly-organized Kazneftedortroy Trust. Two 120-worker dormitories, a medical facility and other community facilities should be completed by September.

All these concrete timetables are rigorously specified in measures by the Central Committee of the Communist Party of Kazakhstan. A progress report was recently presented. Already en route to Siberia is a portion of the equipment, building materials and provisions which we are to supply the construction workers. The quantity of our supply shipments was determined by experts from the republic ministries and agencies, who visited the site in advance for the purpose of calculating and studying actual supply requirements. Several barges with cars for dormitories, bulldozers, fork-lifts and truck-mounted cranes, mobile generators, and various construction equipment and materials are en route to the destination. The republic ministries and agencies, which are working on the basis of contracts and orders placed by the Ministry of Highways, are performing priority-importance jobs in extremely rapid order. Mintyazhstroy (Ministry of Construction of Heavy Industry Enterprises), for example, within a month's time will deliver to Glavrechflot for shipment prefabricated structures for building a 600-bed dormitory and a clubhouse-dining hall in the village of Aleksandrovskeye. In addition, by November it will have fabricated 180 metal forms for production of extremely-needed type PAC-XIV prestressed reinforced concrete slabs. With the assistance of Mintyazhstroy, Minpromstroymaterialy (Ministry of Construction Materials Industry) and Minavtodor (Ministry of Highways), 26,000 cubic meters of slabs of this type will be shipped off to the new Kazneftedortroy Trust by the end of this year.

A fuels and lubricants supply depot is being set up. All duties are distributed -- Minmontazhpetsstroy (Ministry of Installation and Special Construction Work) will fabricate and ship to the oil storage depot in Aleksandrovskeye five tanks (2,000 ton capacity each) and will handle erection. Pipeline fittings and equipment for the oil storage depot will be fabricated by the Kazakh SSR State Committee for Petroleum Products Supply. This same committee will establish a fueling and lubricating facility for road construction equipment and trucks.

An important place in the elaborated coordinated action program is assigned to transport workers -- rivermen, railroaders, and aviators. The people at this republic's Main Administration of the River Fleet have been assigned

particularly important tasks. They must ensure uninterrupted hauling of construction structural components, materials and other freight, must haul more than 160,000 tons of gravel-sand mixture from Tomskaya Oblast with the aid of vessels of the Western Siberian Steamship Company, deliver to Aleksandrovskoye dredges for dredging 1,300 cubic meters of silt from the Ob' River during this year's navigation season, and send barge-mounted cranes to the river terminal for off-loading cargo.

At patron enterprises involved in development of the Western Siberian Oil and Gas Complex, performance of honorable task assignments as a rule is being carried out on a high organizational level. The work force at the Kapchagay Rural Building Structures Combine of this republic's Ministry of Rural Construction labored with great enthusiasm on the fabrication of reinforced concrete structures which make it possible to assemble a complete production shop on site. Minavtodor's Opakarovka Plant completed on schedule an order calling for building and shipping to the port of Pavlodar bunk cars as well as cars modified for field bathhouses, mess cars, shops and other facilities.

This republic's workers received with enthusiasm the party-prescribed measures pertaining to further development of the Western Siberian Oil and Gas Complex. The work forces of many brigades, work shifts and sections are expressing the desire to go to the Siberian construction site. A 60-man brigade from the Construction Mechanization Administration, headed by an honored roadbuilder with 30 years experience and a decorated veteran of the Great Patriotic War, T. Samoylenko, was one of the first to declare its desire to take direct part in building the Siberian roads. We are confident that many other equipment operator brigades will volunteer.

There is no doubt about it: the Siberian land, which contains vast mineral resources, will generously repay Soviet citizens for their heartfelt warmth and concern. Unabating party concern for the fate of development of the oil-producing region of our great nation is a guarantee of this.

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FUELS

AZERBAIJAN OFFSHORE PRODUCTION PROBLEMS STRESSED

Baku VYSHKA in Russian 8 Jul 80 p 2

[Article by R. Ashurov, senior scientist, Gipromorneftegaz Production Economics and Organization Laboratory: "Offshore Drilling Rig"]

[Text] Comrade L. I. Brezhnev's report at the June (1980) CPSU Central Committee Plenum stressed the importance of strengthening this country's fuel-energy base. Leonid Il'ich stated that considerable work in this area is being done, but still more remains to be accomplished.

The oil industry workers of Azerbaijan are called upon to make a large contribution toward solving the fuel-energy problem. But to accomplish this they must do a great deal to increase the efficiency of drilling operations, both on land and offshore.

A recent article entitled "When the Well Has Been Drilled" (VYSHKA, 29 March 1980) discussed the negative effect of poor organization of work in the process of well testing on time to reach completion of oil and gas wells for production.

The state of affairs regarding erection of drilling rigs has today become an additional delaying factor. In past years delays in construction of platform areas and certain foundations were the principal hindrance, while today deficiencies in the performance of rig-building crews, sections, and shops are the major obstacles.

Judge for yourselves: the average rig-building time for the Kaspburneftegazprom Production Association was 22 percent greater than last year's standard time, due to the fact that these crews are short-manned, due to in-shift work stoppages because of lack or delayed delivery of materials and equipment, and due to a low level of mechanization of laborious jobs, plus other impeding factors. Rig-building time expenditures are particularly substantial in the offshore exploration drilling administrations, where rig-building time exceeds normal by 50 to 100 percent.

What are the reasons for unsatisfactory organization of rigging-up activities? The fact is that at the present time five drilling enterprises of

the Kaspburneftegazprom Association contain nine rig-building crews, which are a total of 40 men under strength. In addition, as is indicated by an analysis performed at our institute, they spend almost half of their time performing work not connected with rigging-up activities. Under these conditions there is obviously no point in considering boosting the efficiency of building drilling rigs, and particularly performance of these activities on an industrial basis, in large modules.

Also important is the fact that belonging to different offshore drilling administrations and undermanned crews hinder proper organization of dissemination of the most efficient work methods and advanced know-how. Drilling administration management, which directs its principal attention to making hole, frequently fails to take a good look at the activities of the rig-building crews and fails to meet their needs. For example, in the Bulla offshore exploration drilling administration, the work force of which has achieved excellent results in making hole throughout almost the entire 10th Five-Year Plan, average duration of rigging-up operations last year was almost 15.6 days, as compared with the norm of 8.3.

And yet a solution does exist. Within the framework of the Kaspburneftegazprom Production Association a unified rig-building office should be established, the work force of which would be assigned the task of rigging-up, hauling equipment to the site, assembly, installation and takedown of derrick, rig structures and equipment. Calculations indicate that organization of such an office will make it possible to maintain only five rig-building crews, manned by highly-skilled specialists, to concentrate the requisite quantity of equipment and tools, and to boost the equipment turnover factor. Drillers will be able fully to concentrate their efforts on adopting advanced drilling equipment and techniques and on improving drilling economic indices. The effectiveness of such a reorganization is obvious. We could cite as an example the operating experience of the work force of the Ali-Bayramly rig-building office of the Azneft' Production Association, which has been completing rigging-up operations well ahead of schedule year after year at Muradkhanly and in the Shirvan oil and gas fields.

The offshore rig-building office could be a component of a centralized service and workover operation of the Kaspburneftegazprom Association, organization of which has also become a vital necessity today for our offshore drillers, for the existence of small production service operations attached to each of the five drilling administrations leads to scattering of facilities and equipment and a shortage of highly-skilled specialists in drilling equipment maintenance and repair.

In addition, with the present structure surplus sets of equipment and equipment assemblies are accumulated by the drilling administrations. For example, at the beginning of this year the drilling enterprises of the Kaspburneftegazprom Association were carrying 109 sets of drilling equipment, while only 95 sets were being employed in well construction (in rigging-up, drilling and testing). The drilling enterprises had even

larger quantities of certain equipment assemblies: 195 swivels, 134 crown blocks, etc.

Establishment of a centralized facility with a single accounting operation will in our opinion help us more rapidly eliminate surplus equipment and tools by selling them. In addition, a single facility is more easily outfitted with modern equipment, which will lead to faster, better-quality and less expensive maintenance and repair of drilling equipment.

The CPSU Central Committee and USSR Council of Ministers decree entitled "On Improving Planning and Strengthening the Effect of the Economic Mechanism on Improving Production Efficiency and Work Quality" focuses work forces on improving the output-capital ratio of enterprises by selling surplus equipment (fixed assets), adoption of production mechanization and automation measures, and improvement of organization of production and working conditions. We believe that centralization of rigging-up operations and drilling-assist services should unquestionably improve efficiency of drilling operations and all oil and gas production in the Caspian, helping it reach a level dictated by the demands of today.

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FUELS

PROBLEMS OF MULTIWALL NATURAL GAS PIPELINE ANALYZED

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 8 Jun 80 p 2

[Article by SOTSIALISTICHESKAYA INDUSTRIYA correspondent V. Noskov, Nadym, Tyumenskaya Oblast: "Gas Pipeline Will Become Multiwall"]

[Text] As we know, the Tyumen' North contains large natural gas reserves. steel pipelines running many kilometers are being constructed to transport it to this country's industrial centers. But construction of these buried pipelines requires enormous outlays.

How can costs be reduced? Scientists at the Institute imeni Paton, the All-Union Scientific Research Institute for Construction of Trunk Pipelines (VNIIST), and the All-Union Scientific Research Institute of Natural Gas, jointly with experts at Glavsibtruboprovodstroy, set about to solve this difficult problem. They have just completed a series of unique experiments. They essentially consist in the following: multiwall pipes for transporting natural gas were tested for the first time in harsh northern conditions. The testing program included the most unexpected situations which arise during operation of presently-existing natural gas pipelines. The new pipe passed the test with flying colors.

Employment of multiwall pipe will make it possible greatly to increase pressure in the pipeline and to boost its transmissive capacity. And this means that the cost of building northern natural gas pipelines can be significantly reduced.

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FUELS

KUZBASS-NOVOSIBIRSK EXPERIMENTAL COAL SLURRY PIPELINE SURVEYED

Moscow PRAVDA in Russian 6 Jun 80 p 6

[Article by PRAVDA correspondent A. Bogachuk, Kemerovskaya Oblast: "Coal by Pipe"]

[Text] Pipelines are a possible future means of transporting solid fuel long distances. Technical-economic substantiations for constructing an experimental-commercial trunk slurry pipeline from the Kuzbass to Novosibirsk have been examined.

"Such pipelines have long existed in miniature," states S. P. Kostovetskiy, deputy director of the VNIlgiprougol' Institute. "For 15 years now the Yubileynaya hydraulic mining operation has been 'pumping' three and a half million tons of coking coal by pipeline each year to the Western Siberian Metallurgical Plant. A large percentage of production from the Inskaya hydraulic mining operation is transported in a similar manner to the Belovskaya GRES. It is true that these slurry lines do not exceed 10-11 kilometers in length."

The length of the experimental-commercial pipeline is 250 kilometers. Of course it will seem small in comparison with today's oil and gas pipelines. Pipe only 400 millimeters in diameter will be required to move three and a half to 4 million tons of coal per year, but this quantity fully meets the requirements of Novosibirsk TETs-5.

A coal slurry preparation facility is to be erected at the Inskaya mine, where the pipeline will originate.

"I would compare such a slurry," Semen Petrovich continued, "with thick porridge, in which a spoon will stand. Very fine particles of coal will form a suspension, which will ensure the most efficient conditions of transport and will prevent the pipe from wearing out prematurely. Two pump stations are being built along the route to maintain pressure and normal velocity of slurry movement — 2 meters per second. At the end of the pipeline -- Novosibirsk TETs-5, the coal will be additionally reduced in particle size and will be fed into the boiler fireboxes following water removal."

Scientists hope that experience gained in operating the country's first coal slurry pipeline will make it possible in the future to build major pipelines from the Kuzbass to the Urals and the Kuzbass to the Central regions, capable of transporting 30-50 million tons per year.

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FUELS

BRIEFS

NEW INSTITUTE--Krasnoyarsk--The Institute of Chemistry and Chemical Engineering of the Siberian Department of the USSR Academy of Sciences has officially opened in the kray capital city of Krasnoyarsk. This completes the first stage in establishment of a Krasnoyarsk Affiliate of the Siberian Department of the USSR Academy of Sciences. The new institute should play an important role in the development of science and the productive resources of this kray. Its staff will conduct research in the area of chemical, coal mining and woodworking industry, as well as nonferrous metallurgy. The first-priority task of this scientific establishment is development of an improved process of converting Kansk-Achinsk Basin coal into liquid fuel. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 13 Jun 80 p 2] 3024

WELL TEMPERATURE--L'vov--The Ivano-Frankovsk Instrumentation Plant has started up manufacture of new product items -- the MGN-6 bottom-hole pressure gauge and the TGN-6 bottom-hole thermometer, designed to measure well pressure and temperatures. The new instruments were designed in the plant automation equipment special design office. The pressure gauges will operate at a pressure up to 400 atmospheres. The thermometers can be utilized to measure temperatures from 50 to 600 degrees above zero centigrade. The first consignment of these products has already been shipped to customers. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 13 Jun 80 p 2] 3024

KUZBASS MINE RENOVATION--(TASS)--As a result of renovation, old mines in the Kuzbass are increasing coal production. The Yagunovskaya Mine of the Kuzbassugol Association has boosted annual coal production by 100,000 tons. Installing mechanized equipment at the cutting faces, the miners have completely eliminated manual labor on many operations and have appreciably boosted labor productivity. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 11 Jun 80 p 2] 3024

YAKUTSK MINING INSTITUTE--Yakutsk--The Northern mining Institute has been established in Yakutsk. Its activities include investigation of thermal and mechanical processes in permafrost rock, development of new mining processes, scientific substantiation of mining operations, and problems of organization of labor at the enterprises of the Southern Yakut Coal Complex.

The institute will also work on developing new methods of suppressing dust in the mines. The new scientific establishment's activities will cover not only the enterprises of this northern republic but the entire Northeast as well, where miners are extracting various metals in permafrost conditions. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 8 Jun 80 p 2] 3024

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